

SOUTHWEST FISHERIES SCIENCE CENTER
THIRD QUARTER REPORT - FY 2005
For the Period of April 1- June 30

Submitted by: Roger Hewitt, Division Director, Fisheries Resources Division

Title of accomplishment or milestone: The development of methods to acoustically quantify and identify rockfish and their habitat using a Remotely Operated Vehicle to ground-truth results.

Current status: The field work was completed on June 16th, and data processing and analysis are in progress.

Background information: When the status of cowcod and other commercially important rockfish populations in southern California was estimated to be less than or equal to 25% by the Pacific Fisheries Management Council (PFMC), great concern arose in regards to the potential impact of the recreational fishery on these populations. This concern led to the designation of a Cowcod Conservation Area (CCA; Figure 1) that prohibited fishing for rockfish in a large part of the Southern California Bight (SCB). The CCA was implemented in hopes to protect cowcod and their habitat so that the remaining fish have a chance to reproduce and rebuild the overall population.

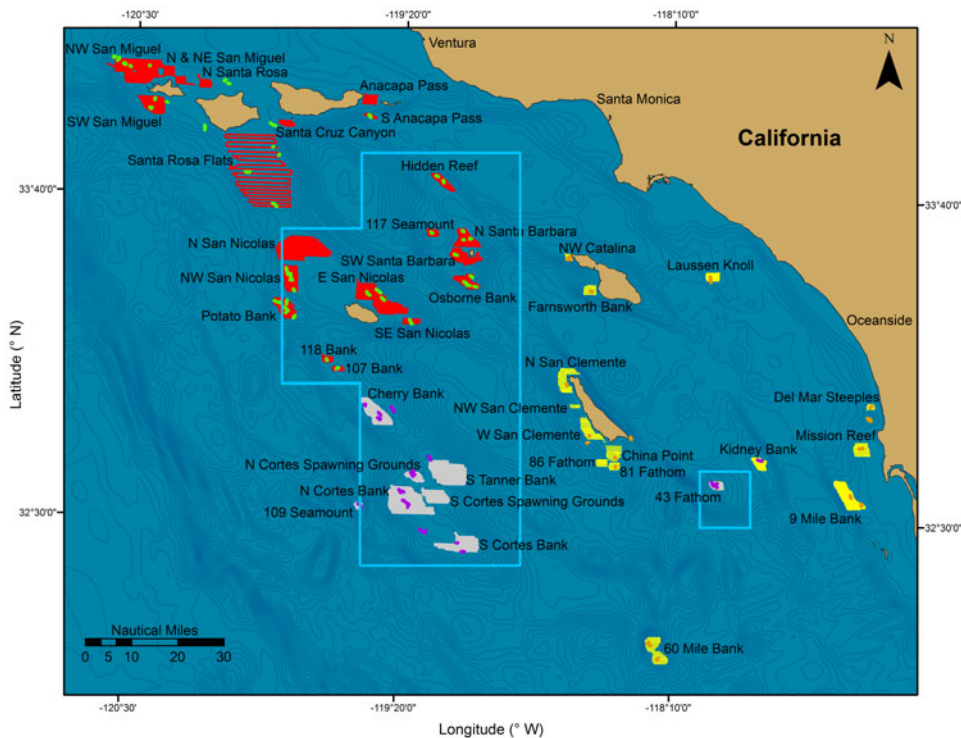


Figure 1. Map of acoustic and ROV sites surveyed during the 2004-2005 field season. The Cowcod Conservation Area is outlined in turquoise. Acoustic survey transect track lines are grey for fall 2004 surveys, red for winter 2005 surveys, and yellow for spring 2005 surveys. ROV transect track lines are purple for fall 2004 surveys, green for winter 2005 surveys, and orange for spring 2005 surveys. 100 m contours are displayed by a thin blue line.

Information on cowcod and rockfish populations within the SCB is limited due to the lack of studies aimed at tracking population densities and fish size distributions over time. The only extensive information available is from intermittent fisheries catch data. For this reason it is crucial that cowcod and other rockfish populations be monitored within and outside of the CCA during the time of closure and thereafter. The challenge thus lies in the question of how to effectively and non-destructively monitor rockfish populations and assess habitat. Past survey methods which use gear like trawl nets are no longer desirable due to the destructive nature of this gear type.

Purpose of Activity: The National Marine Fisheries Service (NMFS) has taken on the challenge of surveying rockfish populations in a non-destructive manner by developing methods that involve acoustic sonar surveys. This technology has been used for invertebrates and other fish species, but never before for rockfish. The main objective of the cruises was to survey a large part of the SCB where rockfish densities were known to be high historically using acoustic methods followed by directed ROV surveys. The goals of the acoustic work were to obtain clear acoustic signatures that indicate relative abundance and potentially size of rockfish, and to record acoustic signatures from habitat that will aid in the construction of standard habitat classifications. The main goals of the ROV work included ground-truthing acoustic data in regards to the amount and type of rockfish present at each site and habitat type. Additional goals of the ROV work included obtaining estimates of rockfish abundance, sizes and species compositions, with the primary focus on key species like cowcod and vermillion rockfish.

Description of accomplishment and significant results: Acoustic surveys were completed aboard the R/V *David Starr Jordan* and F/V *Outer Limits* at all of the planned sites, spanning the entire SCB (Figure 1). Data were processed immediately so that subsequent ROV surveys on the F/V *Outer Limits* could be completed within the boundaries of acoustic survey areas. ROV surveys were completed at nearly all of the acoustic survey sites, and allowed for fish identification and specific habitat classifications using a combination of still and video imagery. The results of acoustic surveys were represented in three-dimensional plots including the ROV transect tracklines (e.g. Figure 2), and two-dimensional plots for further interpretation of the scales to be used for fish and habitat classifications (e.g. Figure 3). Preliminary results suggest agreement between acoustic and ROV survey results for relative fish abundance (i.e. large numbers of fish were observed in ROV surveys where high acoustic returns were recorded, and vice versa). The largest schools of fish were observed in both ROV and acoustic surveys in rocky areas with high relief. Additionally, there was a sufficient amount of habitat data collected during ROV surveys to be used in the construction of acoustic habitat classifications.

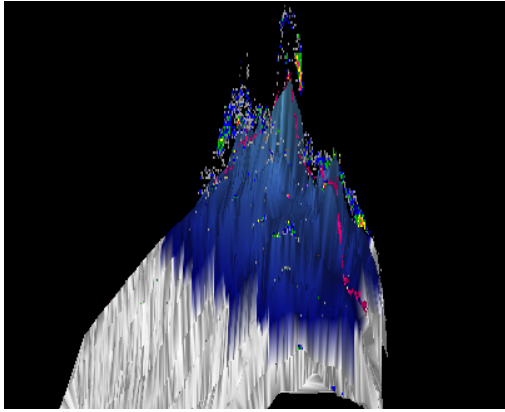


Figure 2. 3-D depiction of fish schools, bathymetry, and ROV survey tracklines (pink) at the 109 Seamount.

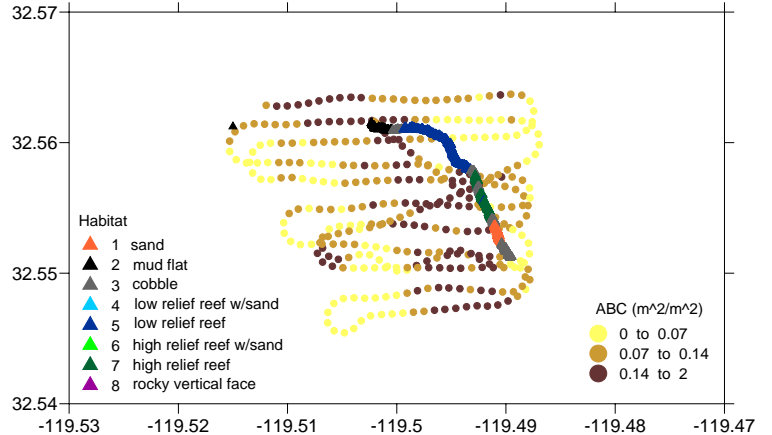


Figure 3. Backscatter due to habitat (ABC (m^2/m^2)) measured in sonar surveys, and habitat type classification determined from ROV surveys at the 109 Seamount.

Significance of accomplishment: After one successful year of data collection results are promising and we now have a large amount of data that can be used to refine rockfish and habitat classifications. This refinement is an important step towards the accomplishment of the final goals: 1) to establish a set protocol for monitoring rockfish populations in southern California by non-destructive methods and, 2) to determine the amount of suitable rockfish habitat available in southern California so that population estimates can be made. The information garnered by monitoring rockfish populations in southern California will be necessary for future decisions concerning recreational fishing regulations and catch limits.

Problems: None.

Contact: Deanna Pinkard, 546-7180